# LS-576

## 5.25” Embedded Miniboard

### User’s Manual

Edition 1.5
2013/10/17

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# Packing List:

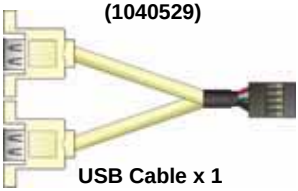
Please check the package content before you starting using the board.

## Hardware:

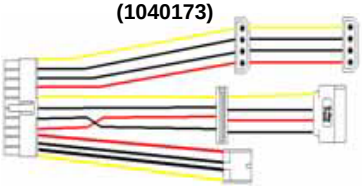
LS-576 Embedded Miniboard x 1

## Cable Kit:

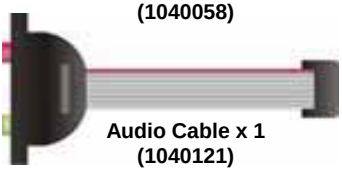
SATA Cable x 2
(1040529)



USB Cable x 1
(1040173)



Power Output Cable x 1
(1040058)



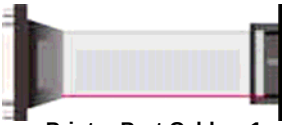
Audio Cable x 1
(1040121)

CPU Cooler x 1
(1190058)

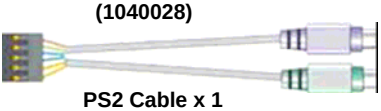
DVI module with bracket x 1
(4120008021 & 1040483)

COM port Cable x 1
(1040045)

Quad COM ports DB9 male Cable x 1
(1040197)



Printer Port Cable x 1
(1040028)

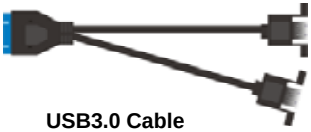


PS2 Cable x 1
(1040131)

## Printed Matters:

**Driver CD (Including User's Manual) x 1**

## Optional:



USB3.0 Cable
(1040532)

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# Chapter 1 <Introduction>

## 1.1 <Product Overview>

**LS-576** the 3rd Generation Intel of the 5.25" Miniboard, supports 3rd Generation Intel® Core™ i7, Core™ i5, Core™ i3 Mobile Processor and features Intel QM77 chipset, integrated HD Graphics, DDR3 memory, REALTEK High Definition Audio, Serial ATA with RAID function for a system and Intel Gigabit LAN.

### Intel Ivy Bridge Processor

The 3rd Generation Intel® Core™ processor family mobile is the next generation of 64-bit, multi-core mobile processor built on 22- nanometer process technology.
Based on a new micro-architecture.

### New features for Intel QM77 chipset

The board integrates Intel QM77 chipset, supports integrated HD Graphics, built-in high speed mass storage interface of Serial ATA interface with RAID function, High Definition Audio with 2 channels surrounding sound.

### All in One multimedia solution

Based on Intel QM77 chipset, the board provides high performance onboard graphics, 24-bit dual channel LVDS interface, DVI and 2 channels High Definition Audio, to meet the very requirement of the multimedia application.

### Flexible Extension Interface

The board provides, two mini-PCIe socket.

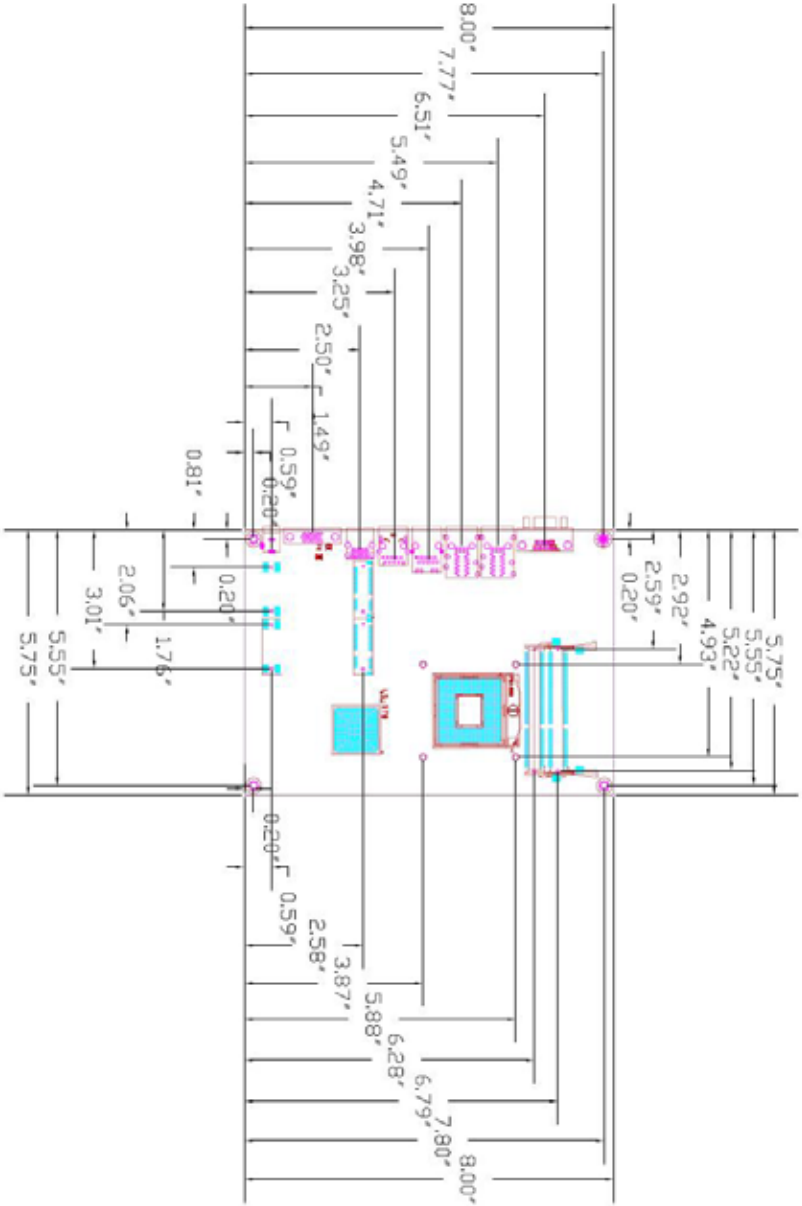
# 1.2 <Product Specification>

| General Specification | |
|---|---|
| **Form Factor** | 5.25-inch Embedded Miniboard |
| **CPU** | 3rd Generation Intel® Core™ i7, Core™ i5, Core™ i3 Mobile Processor<br>Package type: rPGA988B |
| **Memory** | 2 x DDRIII SO-DIMM 1066/1333/1600 MHz up to 16GB<br>Support Non-ECC, unbuffered memory only |
| **Chipset** | Intel QM77 Express chipset |
| **Real Time Clock** | Chipset integrated RTC with onboard lithium battery |
| **Watchdog Timer** | Generates a system reset with internal timer for 1min/s ~255min/s |
| **Power Management** | Supports ACPI 3.0 compliant, |
| **Serial ATA Interface** | 4 x serial ATAII interface with 300MB/s transfer rate<br>2 x serial ATAIII interface with 600MB/s transfer rate<br>Support RAID 0, 1, 5, 10 and Intel Rapid Storage Technology |
| **VGA Interface** | Onboard DSUB15 connector for VGA interface |
| **LVDS Interface** | Onboard 24-bit dual channel LVDS connector with +3.3V/+5V/+12V supply |
| **DVI Interface** | Onboard DVI with 20-pin connector |
| **Audio Interface** | Realtek ALC888 HD Audio |
| **LAN Interface** | 1 x Intel 82579LM Gigabit LAN (Support iAMT8.0)<br>5 x Intel 82574L Gigabit LAN |
| **GPIO interface** | Onboard programmable 8-bit Digital I/O interface |
| **Extended Interface** | 2 x PCIe mini card socket,1 x SIM socket<br>(Optional support mSATA(SATAII) for Mini_Card1,but SATA6 will be disable) |
| **Internal I/O Port** | 1 x PS/2, 4 x RS232, 1 x RS232/422/485, 1 x Parallel, 1 x SMBUS,<br>1 x GPIO, 4 x USB2.0 ports, 2 x USB3.0 ports, 1 x IrDA, 1 x DVI ,<br>1 x LVDS, 1 x PS2, 4 x Serial ATAII, 2 x Serial ATAIII,<br>1 x Front panel Audio and 1 x CDIN |
| **External I/O Port** | 6 x LAN ports, 1 x VGA port, 2 x USB3.0 ports, 1 x RS232,<br>1 x DC connector |
| **Power Requirement** | Standard 20-Pin ATX power supply or 9~24V full range DC Input |
| **Dimension** | 203mm x 146mm |
| **Temperature** | Operating within 0~60 centigrade<br>Storage within –20~85 centigrade |
| **Ordering Code** | |
| **LS-576TXD** | Intel PGA988B+ QM77 Onboard VGA, LVDS, DVI, LAN, USB2.0, USB3.0, HD Audio, SATAII ,SATAIII, SMBUS, LPC, SIM, GPIO and PCI Express mini card. |
| **LS-576TXDS** | Intel PGA988B+ QM77 Onboard VGA, LVDS, DVI, LAN, USB2.0, USB3.0, HD Audio, SATAII ,SATAIII, SMBUS, LPC, SIM, GPIO, PCI Express mini card, mSATA. |

The specifications may be different as the actual production.

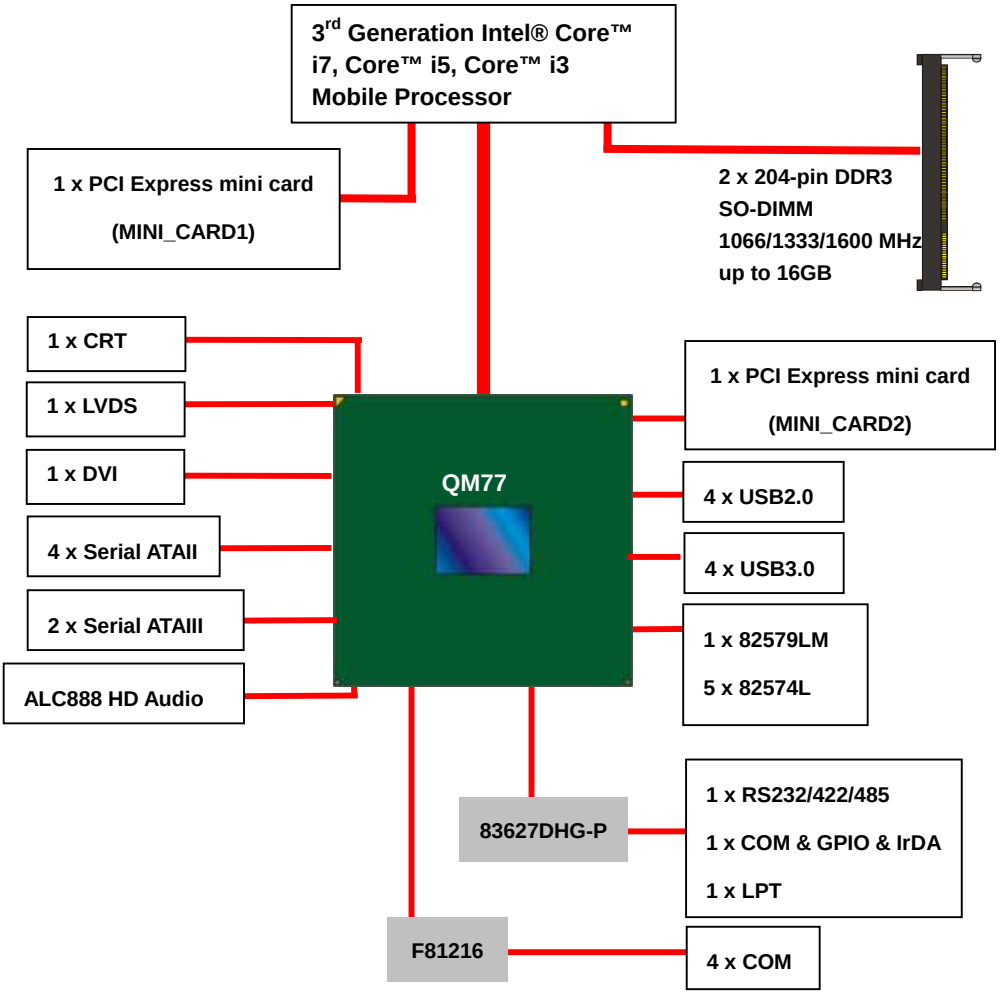
For further product information please visit the website at http://www.commell.com.tw.

## 1.3 <Mechanical Drawing>



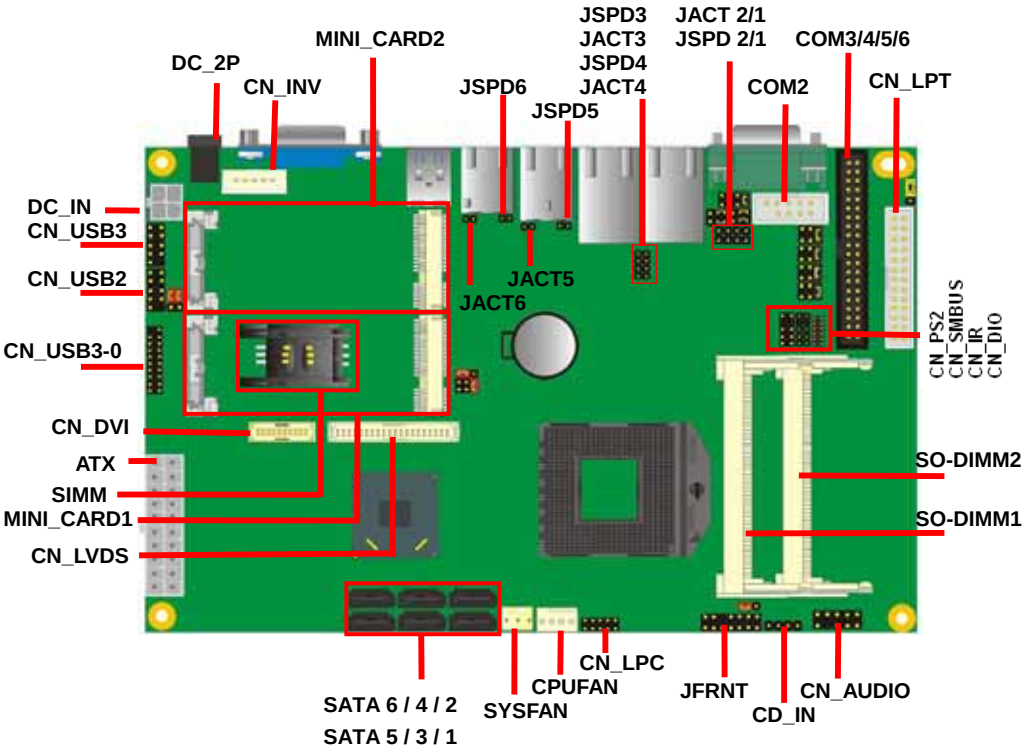

Unit: inch

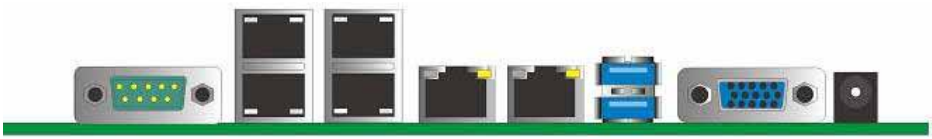
## 1.4 <Block Diagram>


3rd Generation Intel® Core™ i7, Core™ i5, Core™ i3 Mobile Processor
1 x PCI Express mini card (MINI_CARD1)
2 x 204-pin DDR3 SO-DIMM 1066/1333/1600 MHz up to 16GB
1 x CRT
1 x LVDS
1 x DVI
4 x Serial ATAII
2 x Serial ATAIII
ALC888 HD Audio
QM77
1 x PCI Express mini card (MINI_CARD2)
4 x USB2.0
4 x USB3.0
1 x 82579LM
5 x 82574L
83627DHG-P
1 x RS232/422/485
1 x COM & GPIO & IrDA
1 x LPT
F81216
4 x COM

# Chapter 2 <Hardware Setup>

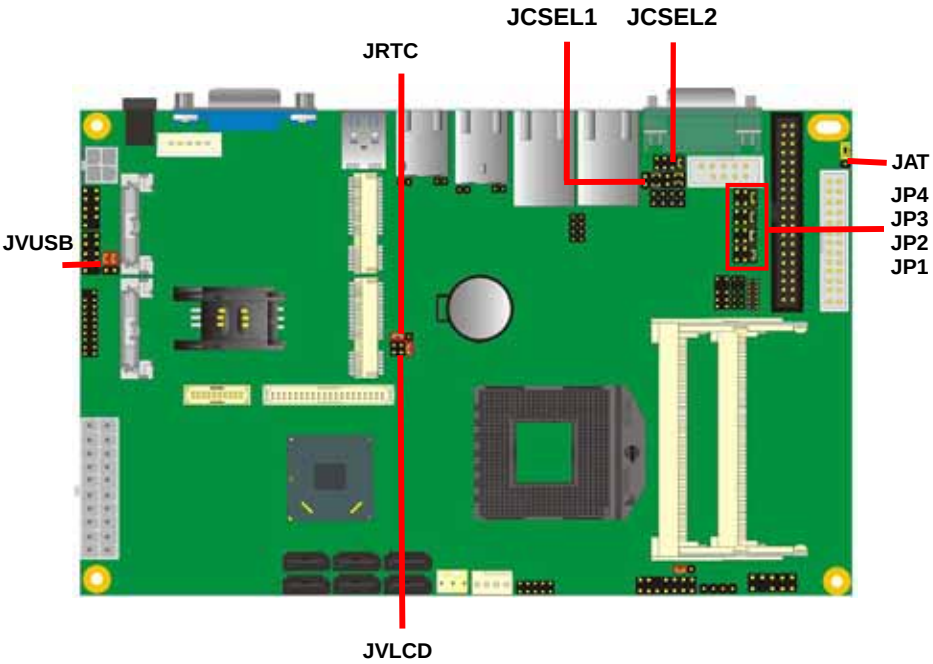
## 2.1 <Connector Location>



## 2.2 <Jumper Location & Reference>

| Jumper | Function |
|---|---|
| **JRTC** | CMOS Operating/Clear Setting |
| **JVLCD** | Panel Voltage Setting |
| **JAT** | Power mode select |
| **JP1** | Com1 Voltage Setting (For Pin 9) |
| **JP2** | Com2 Voltage Setting (For Pin 9) |
| **JP3** | Com3 Voltage Setting (For Pin 9) |
| **JP4** | Com4 Voltage Setting (For Pin 9) |
| **JCSEL1**<br>**JCSEL2** | CN_COM2 RS-232 RS422 RS485 Setting<br>CN_IR IrDA Setting |
| **JVUSB** | USB Voltage Setting |



# 2.3 <Connector Reference>

## 2.3.1 <Internal Connectors>

| Connector | Function | Remark |
|---|---|---|
| CPU | Socket rPGA988B for PGA988 CPU | |
| SO-DIMM 1/2 | 204 -pin DDR3 SO-DIMM socket | |
| SATA 1/2 | 7-pin Serial ATAIII connector | |
| SATA 3/4/5/6 | 7-pin Serial ATAII connector | |
| DC_IN | DC 9~24V input connector | |
| ATX | 20-pin power input connector | ATX Mode |
| | 20-pin power output connector | DC Input Mode |
| CN_AUDIO | 5 x 2-pin audio connector | |
| CD_IN | 4-pin CD-ROM audio input connector | |
| CN_DIO | 6 x 2-pin digital I/O connector | |
| CN_USB 2/3 | 5 x 2-pin USB2.0 connector | |
| CN_USB3-0 | 10 x 2-pin USB3.0 connector | |
| CPUFAN | 4-pin CPU cooler fan connector | |
| SYSFAN | 3-pin system cooler fan connector | |
| CN_LVDS | 20 x 2-pin LVDS connector | |
| CN_INV | 5-pin LCD inverter connector | |
| CN_IR | 5-pin IrDA connector | |
| CN_COM 2 | 9-pin RS232/RS422/RS485 | |
| CN_COM 3/4/5/6 | 20 x 2-pin 4 x RS232 | |
| CN_LPC | 5 x 2-pin LPC connector | |
| CN_LPT | 13 x 2-pin printer connector | |
| JFRNT | 14-pin front panel switch/indicator connector | |
| Mini-PCIE1/2 | 2 x 52-pin Mini-PCIE socket | |
| JAT | Power mode select | |
| JSPD 1/2/3/4/5/6 | LAN Speed LED connector | |
| JACT 1/2/3/4/5/6 | LAN Activity LED connector | |

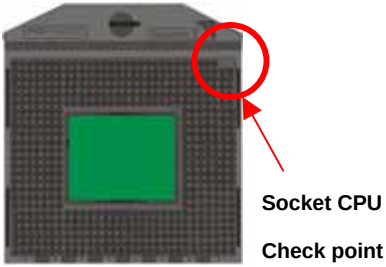
## 2.3.2 <External Connectors>

| Connector | Function | Remark |
|---|---|---|
| COM1 | DB9 Serial port connector | |
| RJ45-1~6 | 6 x RJ45 LAN connector | |
| USB | 2 x USB 3.0 connector | |
| CRT | DB15 VGA connector | |
| DC_2P | DC 9~24V input jack | |

# 2.4 <CPU and Memory Setup>

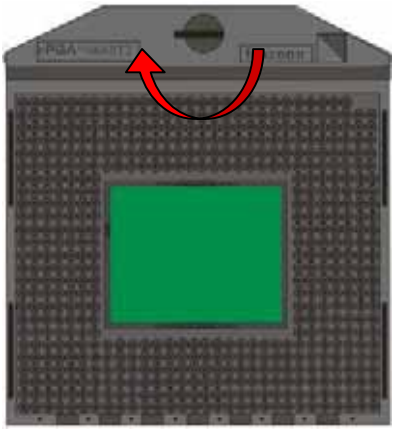
## 2.4.1 <CPU Setup>

The board comes with the socket rPGA988 for Intel **IvyBridge** Processor, Please follow the instruction to install the CPU properly.




**1. Use the flat-type screw drive to unlock the CPU socket**

**2. Follow the pin direction to install the processor on the socket**

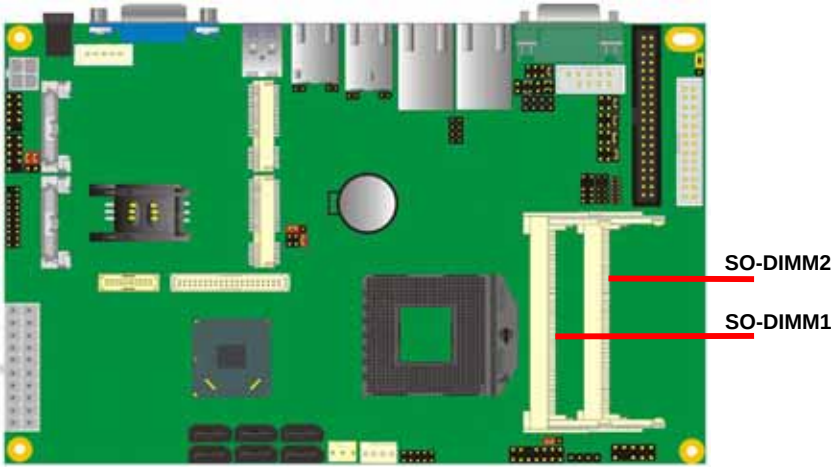


**3. Lock the socket**

### 2.4.2 <Memory Setup>

The board provides 2 x 204-pin DDR3 SO-DIMM to support 1066/1333/1600MHz DDR3 memory module up to 16GB.

Support Non-ECC, unbuffered memory only.



## 2.5 <CMOS & ATX Setup>

The board's data of CMOS can be setting in BIOS. If the board refuses to boot due to inappropriate CMOS settings, here is how to proceed to clear (reset) the CMOS to its default values.

**Jumper: JRTC**
**Type: Onboard 3-pin jumper**

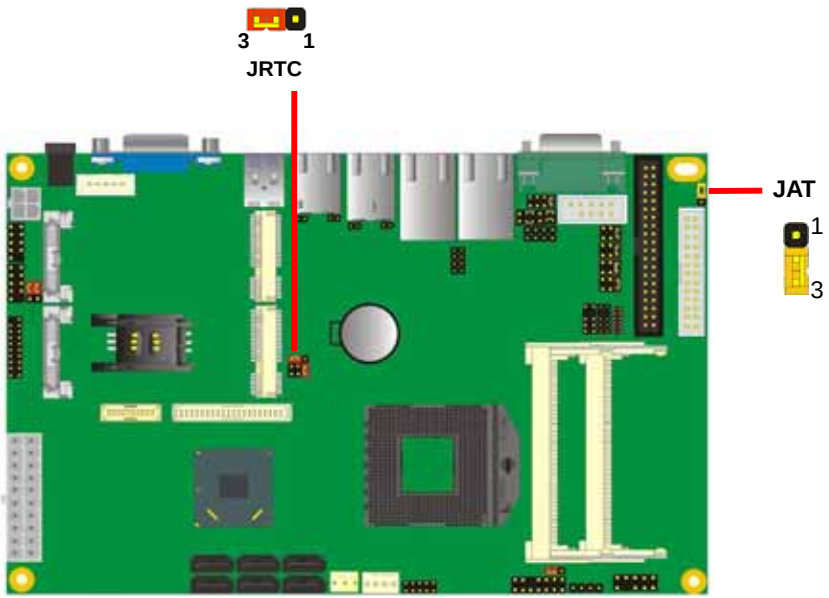
| JRTC | Mode |
|---|---|
| 1-2 | Clear CMOS |
| 2-3 | Normal Operation |

Default setting: 2-3

**Jumper: JAT**
**Type: onboard 3-pin jumper**

| JAT | Mode |
|---|---|
| **1-2** | AT Mode |
| **2-3** | ATX Mode |

Default setting:2-3



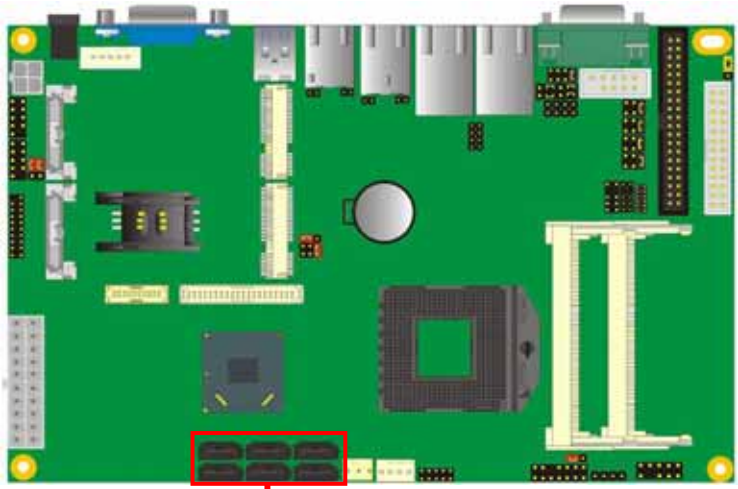
## 2.6 <Serial ATA Interface>

**LS-576** has Four Serial ATA II(SATA Port3/4/5/6) & Two Serial ATA III(SATA Port1/2) interfaces with RAID function, the transfer rate of the Serial ATA II can be up to 300MB/s & Serial ATA III can be up to 600MB/s. Please go to http://www.serialata.org/ for more about Serial ATA technology information. Based on Intel® PCH, it supports **Intel® Matrix Storage Technology** with combination of RAID 0,1,5 and 10. The main features of RAID on Intel® QM77 PCH are listed below:

1. Supports for up to RAID volumes on a single, two-hard drive RAID array.
2. Supports for two, two-hard drive RAID arrays on any of six Serial ATA ports.
3. Supports for Serial ATA ATAPI devices.
4. Supports for RAID spares and automatic rebuild.
5. Supports on RAID arrays, including NCQ and native hot plug.

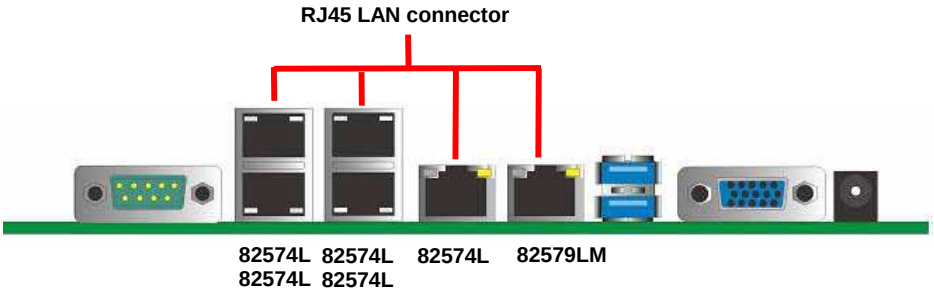
***For more information please visit Intel's official website.***

For more about the system setup for Serial ATA, please check the chapter of SATA configuration.



## 2.7 <Ethernet Interface>

The board integrates with Six Intel PCI Express Gigabit Ethernet controllers, as the PCI Express x1 can speed up to 250MB/s of transfer rate instead of late PCI bus with 133MB/s of transfer rate. The Intel Gigabit Ethernet supports triple speed of 10/100/1000Base-T, with IEEE802.3 compliance and Wake-On-LAN supported.



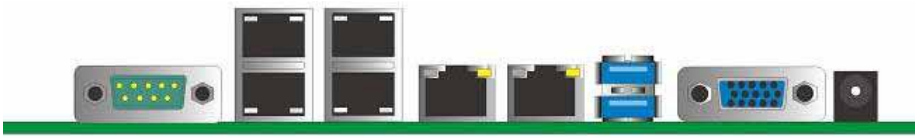
## 2.8 <Onboard Display Interface>

Based on Intel **Ivy Bridge** CPU with built-in HD Graphic, the board provides one DB15 connector on real external I/O port, one 40-pin LVDS interface with 5-pin LCD backlight inverter connector and provides 20-pin DVI interface.

The board provides dual display function with clone mode and extended desktop mode for CRT, LCD and DVI.

### 2.8.1 <Analog Display>

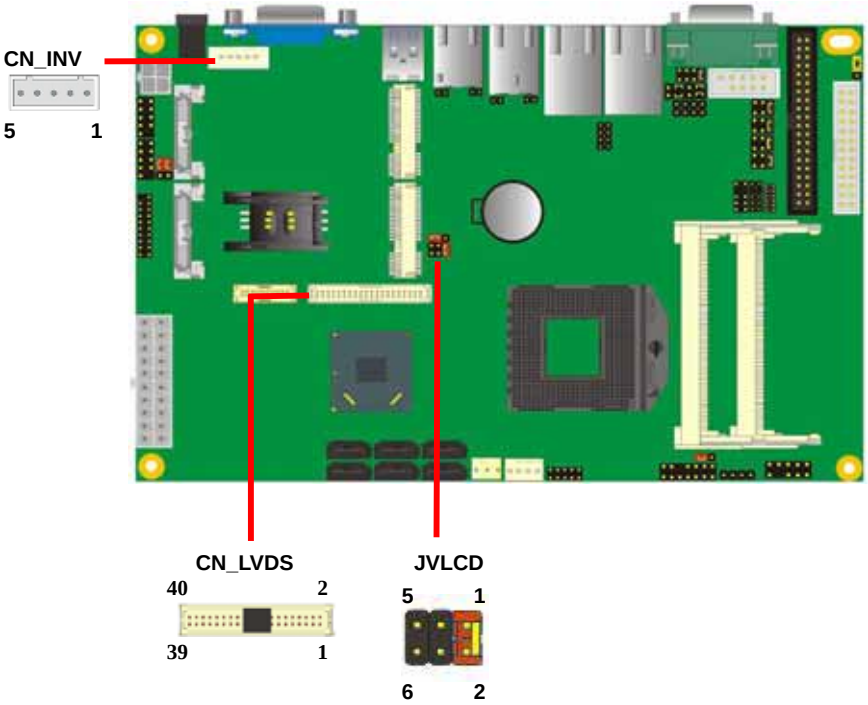
Please connect your CRT or LCD monitor with DB15 male connector to the onboard DB15 female connector on rear I/O port .



**CRT**

## 2.8.2 <Digital Display>

The board provides one 40-pin LVDS connector for 24-bit single/dual channel panels, supports up to 2048 x 1536 (UXGA) resolution, with one LCD backlight inverter connector and one jumper for panel voltage setting.




***Effective patterns of connection: 1-2 / 3-4 / 5-6***

***Warning: others cause damages***

Connector: **CN_INV**
Type: 5-pin LVDS Power Header

| Pin | Description |
|---|---|
| 1 | +12V |
| 2 | Reserved (Note) |
| 3 | GND |
| 4 | GND |
| 5 | ENABKL |

Note: Reserved for MB internal test
Please treat it as NC.

Connector: **JVLCD**
Type: 6-pin Power select Header

| Pin | Description |
|---|---|
| 1-2 | LCDVCC **(3.3V)** |
| 3-4 | LCDVCC **(5V)** |
| 5-6 | LCDVCC **(12V)** |

**Default: 1-2**

Connector: **CN_LVDS**
Type: onboard 40-pin connector for LVDS connector
Connector model:
E&T 3950-B40C-00R or similar (**HIROSE DF13-40DP-1.25V** compatible)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 2 | LCDVCC | 1 | LCDVCC |
| 4 | GND | 3 | GND |
| 6 | ATX0- | 5 | BTX0- |
| 8 | ATX0+ | 7 | BTX0+ |
| 10 | GND | 9 | GND |
| 12 | ATX1- | 11 | BTX1- |
| 14 | ATX1+ | 13 | BTX1+ |
| 16 | GND | 15 | GND |
| 18 | ATX2- | 17 | BTX2- |
| 20 | ATX2+ | 19 | BTX2+ |
| 22 | GND | 21 | GND |
| 24 | ACLK- | 23 | BTX3- |
| 26 | ACLK+ | 25 | BTX3+ |
| 28 | GND | 27 | GND |
| 30 | ATX3- | 29 | BCLK- |
| 32 | ATX3+ | 31 | BCLK+ |
| 34 | GND | 33 | GND |
| 36 | DDCPCLK | 35 | SMBCKL |
| 38 | DDCPDATA | 37 | SMBDATA |
| 40 | N/C | 39 | SPDIFO |

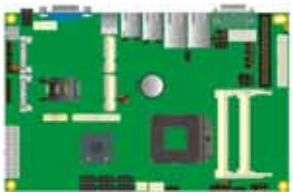
To setup the LCD, you need the component below:

1. A panel with LVDS interfaces.
2. An inverter for panel's backlight power.
3. A LCD cable and an inverter cable.

**For the cables, please follow the pin assignment of the connector to make a cable, because every panel has its own pin assignment, so we do not provide a standard cable; please find a local cable manufacture to make cables.**

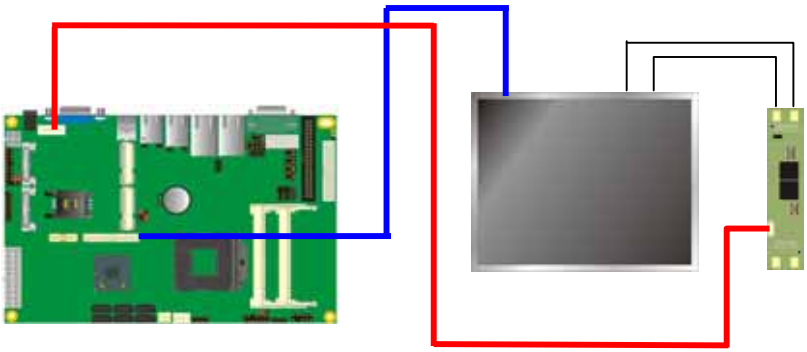
## LCD Installation Guide:

1. Preparing the **LS-576**, **LCD panel** and the **backlight inverter**.



2. Please check the datasheet of the panel to see the voltage of the panel, and set the jumper **JVLCD** to +12V or +5V or +3.3V.
3. You would need a LVDS type cable.

4. To connect all of the devices well.



After setup the devices well, you need to select the LCD panel type in the BIOS.

The panel type mapping is list below:

| BIOS panel type selection form (BIOS Version:1.0) | | | |
|---|---|---|---|
| Single / Dual channel | | Single / Dual channel | |
| NO. | Output format | NO. | Output format |
| 1 | 640 x 480 | 9 | 1680 x 1050 |
| 2 | 800 x 600 | 10 | 1920 x 1200 |
| 3 | 1024 x 768 | 11 | 1440 x 900 |
| 4 | 1280 x 1024 | 12 | 1600 x 900 |
| 5 | 1400 x 1050 Reduced Blanking | 13 | 800 x 480 |
| 6 | 1400 x 1050 non-Reduced Blanking | 14 | 1280 x 800 |
| 7 | 1680 x 1200 | 15 | 1920 x 1080 |
| 8 | 1366 x 768 | 16 | OEM Keep |

### 2.8.3 <DVI Interface>

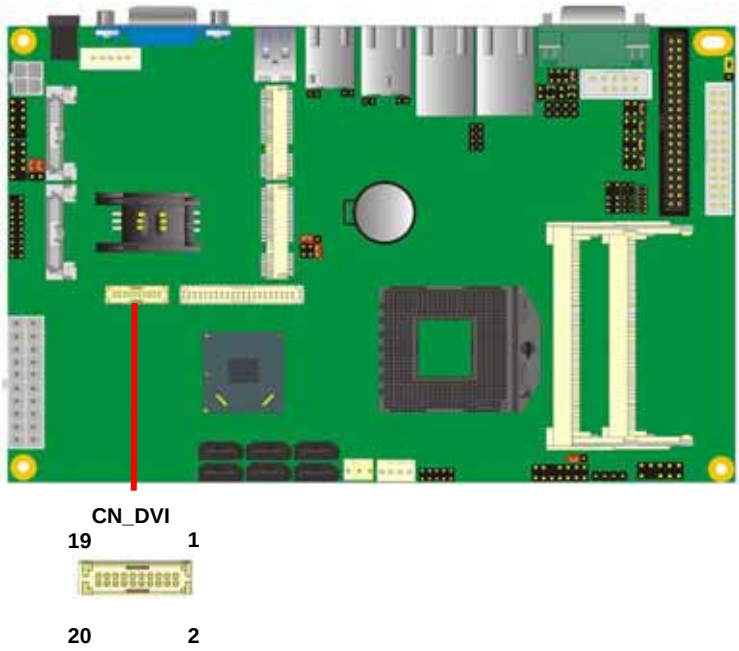
The board provides one 20-pin DVI connector,

supports up to 1920 x 1080 resolution.

Connector: **CN_DVI**

Type: onboard 20-pin connector for DVI connector

| Pin Number | Assignment | Pin Number | Assignment |
|---|---|---|---|
| 1 | +5V | 2 | +3.3V |
| 3 | HPD | 4 | Ground |
| 5 | TMDSTX0N | 6 | TMDSTX0P |
| 7 | Ground | 8 | TMDSTX1N |
| 9 | TMDSTX1P | 10 | Ground |
| 11 | TMDSTX2N | 12 | TMDSTX2P |
| 13 | Ground | 14 | TMDSTXCN |
| 15 | TMDSTXCP | 16 | Ground |
| 17 | DVI_DA | 18 | DVI_SL |
| 19 | AUXN | 20 | AUXP |

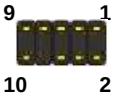


## 2.9 <Integrated Audio Interface>

The board provides the onboard high definition audio with Realtek ALC888

**Connector: CN_AUDIO**

Type: 10-pin (2 x 5) header (pitch = 2.54mm)

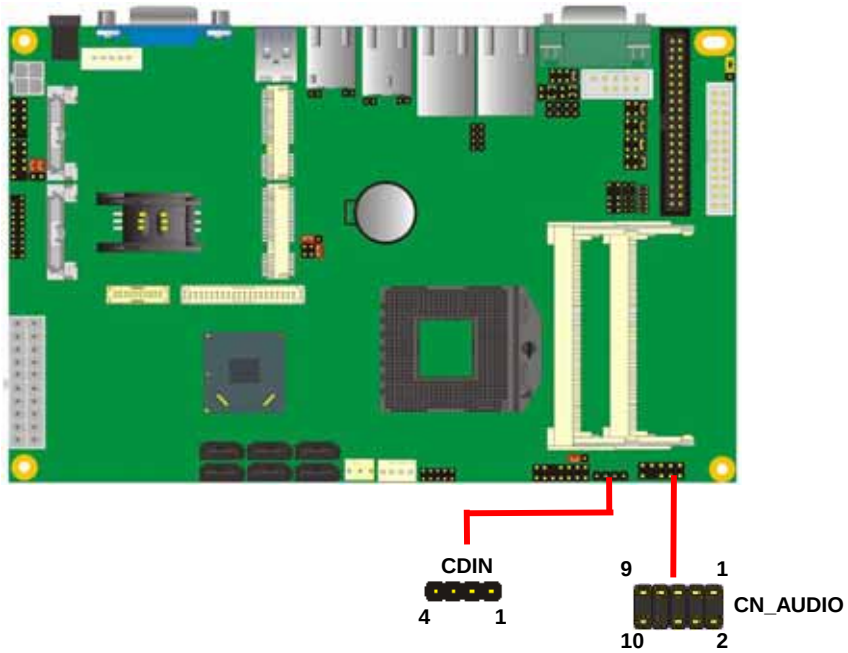



| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | MIC_L | 2 | Ground |
| 3 | MIC_R | 4 | N/C |
| 5 | Speaker_R | 6 | MIC Detect |
| 7 | SENSE | 8 | N/C |
| 9 | Speaker_L | 10 | Speaker Detect |

**Connector: CDIN**

Type: 4-pin header (pitch = 2.54mm)

| Pin | Description |
|---|---|
| 1 | CD – Left |
| 2 | Ground |
| 3 | Ground |
| 4 | CD – Right |



## 2.10 <USB Interface>

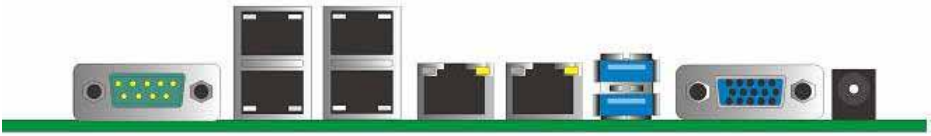
**LS-576** integrates four USB3.0 ports and four USB2.0 ports.

The specifications of USB3.0 are listed below:

| Interface | USB3.0 |
|---|---|
| Controller | Intel®QM77 |
| Transfer Rate | Up to 5Gb/s |
| Voltage | 5V |

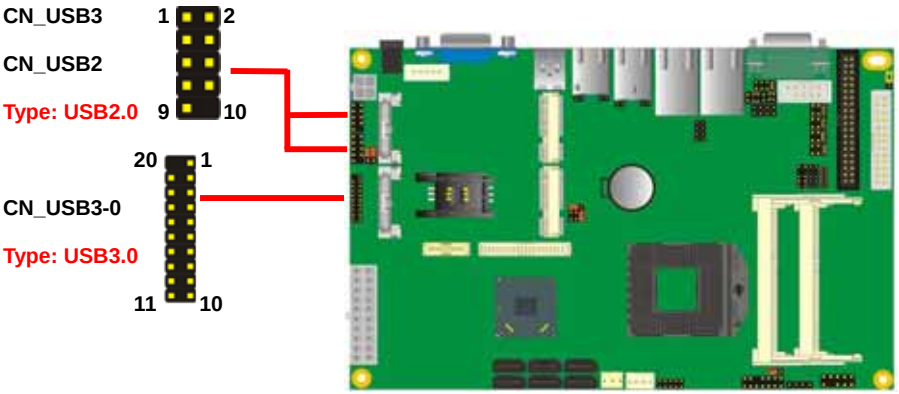
The specifications of USB2.0 are listed below:

| Interface | USB2.0 |
|---|---|
| Controller | Intel®QM77 |
| Transfer Rate | Up to 480Mb/s |
| Voltage | 5V |



**USB**

**Type: USB3.0**



Connector: **CN_USB3-0**

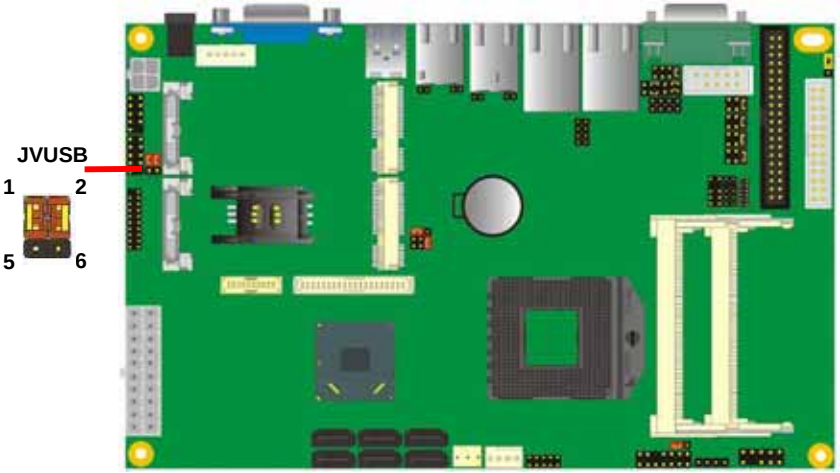
Type: 20-pin (2 x 10) header (pitch = 2.0mm)

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | VCC | 20 | NC |
| 2 | USB3.0_RX0- | 19 | VCC |
| 3 | USB3.0_RX0+ | 18 | USB3.0_RX1- |
| 4 | Ground | 17 | USB3.0_RX1+ |
| 5 | USB3.0_TX0- | 16 | Ground |
| 6 | USB3.0_TX0+ | 15 | USB3.0_TX1- |
| 7 | Ground | 14 | USB3.0_TX1+ |
| 8 | Data0- | 13 | Ground |
| 9 | Data0+ | 12 | Data1- |
| 10 | NC | 11 | Data1+ |

Connector: **CN_USB2/3**

Type: 10-pin (2 x 5) header (pitch = 2.54mm)

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | VCC | 2 | VCC |
| 3 | Data0- | 4 | Data1- |
| 5 | Data0+ | 6 | Data1+ |
| 7 | Ground | 8 | Ground |
| 9 | Ground | 10 | N/C |



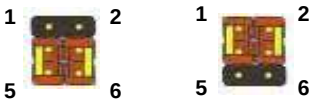

Connector: **JVUSB**

Type: 6-pin Power select jumper

| Pin | Description |
|---|---|
| 1-3 & 2-4 | 5V_SB |
| 3-5 & 4-6 | 5V |

**Default: 1-3 & 2-4**

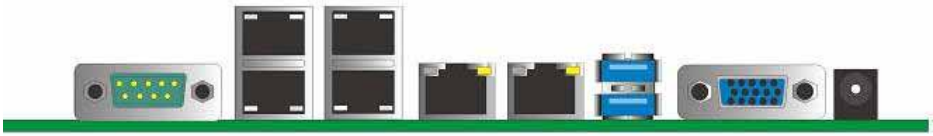
***Effective patterns of connection: 1-3 & 2-4 or 3-5 & 4-6***




***Warning: others cause damages***

## 2.11 <Serial Port>

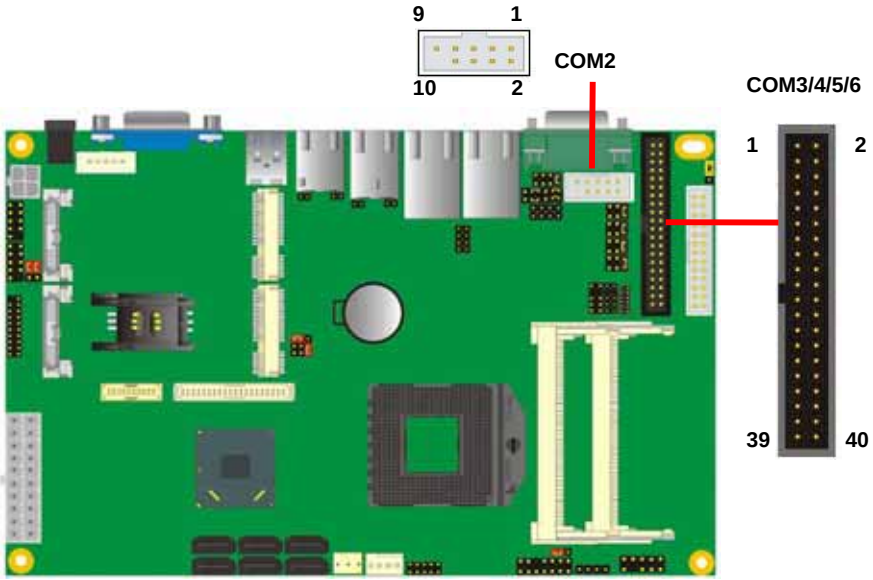
The board supports five RS232 serial port and one jumper selectable RS232/422/485 serial ports. The jumper JCSEL1 & JCSEL2 can let you configure the communicating modes for COM2.



**COM1**

Connector: **COM1**
Type: 9-pin D-sub male connector on bracket for COM1

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | DCD | 2 | RXD |
| 3 | TXD | 4 | DTR |
| 5 | GND | 6 | DSR |
| 7 | RTS | 8 | CTS |
| 9 | RI | 10 | N/C |



Connector: **COM2**
Type: 9-pin BOX header

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | DCD/422TX-/485- | 2 | RXD/422TX+/485+ |
| 3 | TXD/422RX+ | 4 | DTR/422RX- |
| 5 | GND | 6 | DSR |
| 7 | RTS | 8 | CTS |
| 9 | RI | 10 | N/C |

**Setting RS-232 & RS-422 & RS-485 for COM2**

Connector: **COM3/4/5/6**
Type: 40-pin BOX header

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | DCD1 | 2 | RXD1 |
| 3 | TXD1 | 4 | DTR1 |
| 5 | GND1 | 6 | DSR1 |
| 7 | RTS1 | 8 | CTS1 |
| 9 | RI1 | 10 | N/C |
| 11 | DCD2 | 12 | RXD2 |
| 13 | TXD2 | 14 | DTR2 |
| 15 | GND2 | 16 | DSR2 |
| 17 | RTS2 | 18 | CTS2 |
| 19 | RI2 | 20 | N/C |
| 21 | DCD3 | 22 | RXD3 |
| 23 | TXD3 | 24 | DTR3 |
| 25 | GND3 | 26 | DSR3 |
| 27 | RTS3 | 28 | CTS3 |
| 29 | RI3 | 30 | N/C |
| 31 | DCD4 | 32 | RXD4 |
| 33 | TXD4 | 34 | DTR4 |
| 35 | GND4 | 36 | DSR4 |
| 37 | RTS4 | 38 | CTS4 |
| 39 | RI4 | 40 | N/C |

| Function | JCSEL2 | JCSEL1 |
|---|---|---|
| IrDA | | |
| RS-422 | | |
| RS-485 | | |
| RS-232 | | |

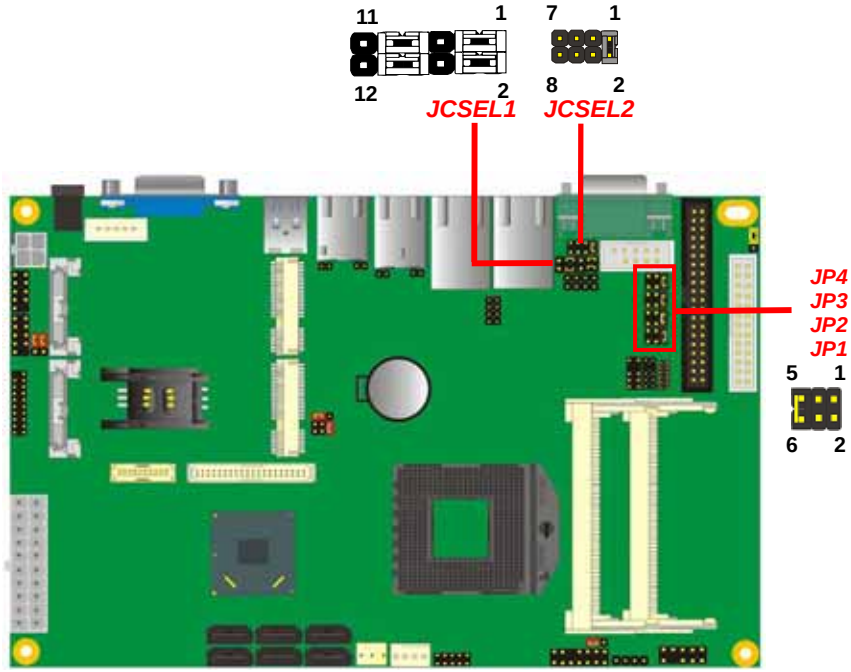
Default setting:

**JCSEL1: (1-3, 2-4, 7-9, 8-10) JCSEL2: (1-2)**

Jumper: **JP1/JP2/JP3/JP4 (COM1/2/3/4)**
Type: onboard 6-pin header

| Power Mode | JP1/2/3/4 |
|---|---|
| Pin 9 with 5V Power | 1-2 |
| Pin 9 with 12V Power | 3-4 |
| Standard COM port | 5-6 |

**Default setting (5-6)**


11
1
12
2
JCSEL1
7
1
8
2
JCSEL2
JP4
JP3
JP2
JP1
5
1
6
2

## 2.12 <PCIE Mini Card and SIM Interface>

The board provides two PCIE mini card sockets and a SIM socket.

MINI_CARD1 is the second Mini-PCIe slot for long size Mini-PCIe cards.

However, if you are trying to use 3G Mini-PCIe card with a SIM card then place your 3G Mini-PCIe card in this slot and put your SIM card into the SIM card socket beneath this

MINI_CARD1 support 3G PCIE Mini card with SIM.

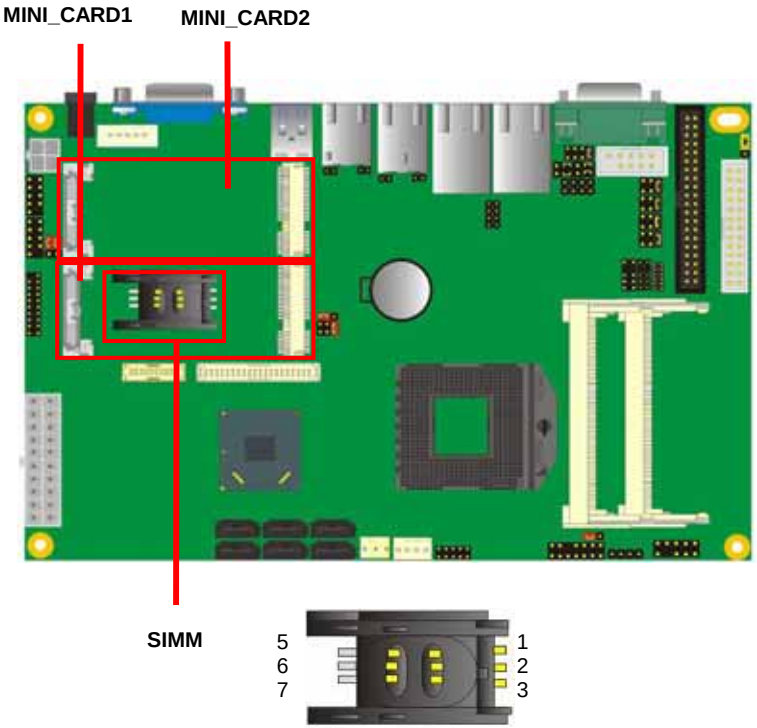
MINI_CARD1 slot and option support mSATA ,but SATA6 will be disable.

MINI_CARD2 is the first Mini-PCIe slot for long size Mini-PCIe cards.

Please be noted that the MPX-SDVOD card must be placed in this slot.

The MPX-SDVOD card will not work if it is placed in other slot.

Please also be noted that this slot is the only slot for MPX-SDVOX card but a customized BIOS is needed for the MPX-SDVOX card. Please contact Commell for customized BIOS for your MPX-SDVOX card.




Connector: **SIMM**
Type: 6-pin SIM socket

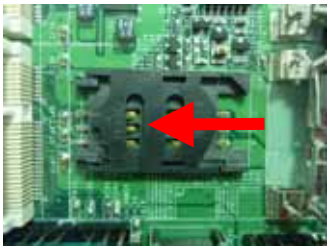
| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | SIMVCC | 2 | SIMRST |
| 3 | SIMCLK | 4 | NC |
| 5 | GND | 6 | SIMVPP |
| 7 | SIMDATA | | |

### 2.12.1 <SIM Setup>

**Step1.**

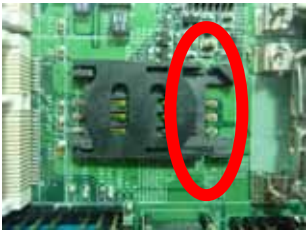
SIM card holder is marked by circle.

Slide the cap toward OPEN direction.



**Step 2.**

Make sure that the cap is now at the OPEN position.



**Step 3.**

Flip the cap up for inserting a SIM card into.

**Step 4.**

Insert a SIM card as shown in the photo.

Be sure that the corner cut is on top and the golden pads are up.

**Step 5.**

Now, flip down the cap as shown in the photo.

**Step 6.**

Press down and slide the cap to the CLOSE position.

Be sure that the cap is tightly held with the socket.

## 2.13 <GPIO and SMBUS Interface>

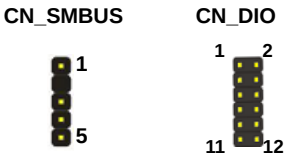
The board provides a programmable 8-bit digital I/O interface; you can use this general purpose I/O port for system control like POS or KIOSK.

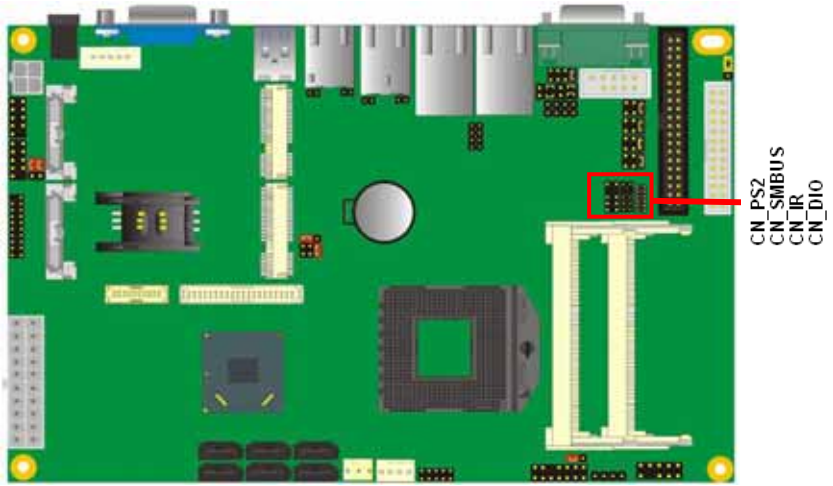
Connector: **CN_DIO**
Type: 12-pin (6 x 2) header (pitch = 2.0mm)

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | Ground | 2 | Ground |
| 3 | GP10 | 4 | GP14 |
| 5 | GP11 | 6 | GP15 |
| 7 | GP12 | 8 | GP16 |
| 9 | GP13 | 10 | GP17 |
| 11 | 5V | 12 | 12V |

Connector: **CN_SMBUS**
Type: 5-pin header for SMBUS Ports

| Pin | Description |
|---|---|
| 1 | VCC |
| 2 | N/C |
| 3 | SMBDATA |
| 4 | SMBCLK |
| 5 | Ground |



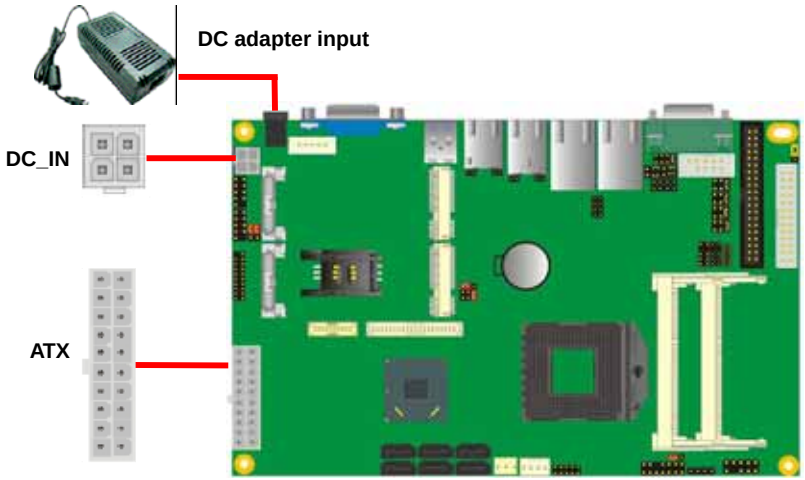
# 2.14 <Power Supply and Fan Interface >

## 2.14.1 <Power Input>

The board requires onboard 4-pin DC-input connector voltage range is from 9V to 24V, or onboard 20-pin ATX2.0, for the input current, please take a reference of the power consumption report on appendix.

Connector: **DC_IN**
Type: 4-pin DC power connector

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | Ground | 2 | Ground |
| 3 | +9~+24V | 4 | +9~+24V |




Connector: **ATX** *(It also can become Output when DC-IN be used)*
Type: 20-pin ATX power connector

| PIN assignment | | | |
|---|---|---|---|
| 1 | 3.3V | 11 | 3.3V |
| 2 | 3.3V | 12 | -12V |
| 3 | GND | 13 | GND |
| 4 | 5V | 14 | -PSON |
| 5 | GND | 15 | GND |
| 6 | 5V | 16 | GND |
| 7 | GND | 17 | GND |
| 8 | PW_OK | 18 | N/C |
| 9 | 5V_SB | 19 | 5V |
| 10 | 12V | 20 | 5V |

### 2.14.2 <Power Output>

The board provides one 20-pin ATX connector for +5V/+12V output for powering your HDD, CDROM or other devices.

**Attention: When DC-IN had power supplied, the ATX become output !**

**Avoid DC-IN and ATX power supply input at the same time !**

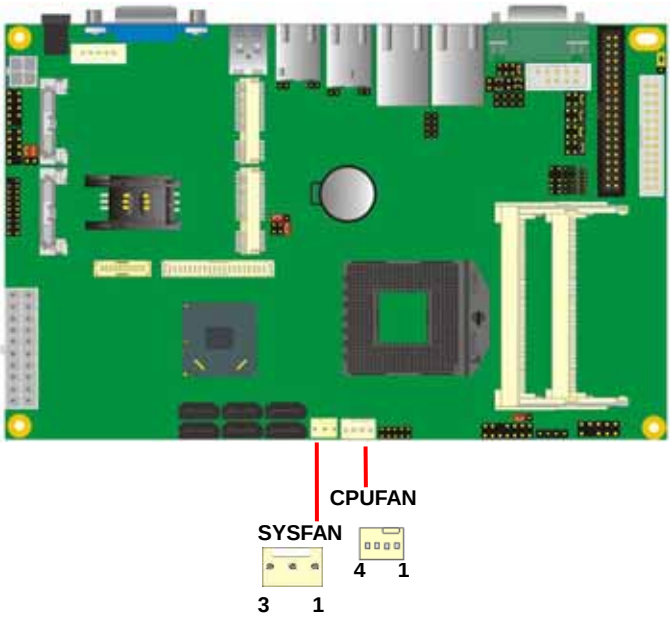
Connector: **ATX** *(When DC-IN be used)*
Type: 20-pin ATX connector for +5V/+12V **Output**

| PIN assignment | | | |
|---|---|---|---|
| 1 | * | 11 | * |
| 2 | * | 12 | * |
| 3 | * | 13 | * |
| 4 | 5V | 14 | * |
| 5 | GND | 15 | * |
| 6 | * | 16 | GND |
| 7 | GND | 17 | GND |
| 8 | * | 18 | * |
| 9 | * | 19 | * |
| 10 | 12V | 20 | 5V |

*Note: Maximum output voltage:* ***12V/2A & 5V/3A***

### 2.14.3 <Fan connector>

The board provides one **4-pin** fan connectors supporting smart fan for CPU cooler and one **3-pin** cooler fan connectors for system.




Connector: **CPUFAN**
Type: 4-pin fan wafer connector

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | Ground | 2 | +12V |
| 3 | Fan Speed Detection | 4 | Fan Control |

Connector: **SYSFAN**
Type: 3-pin fan wafer connector

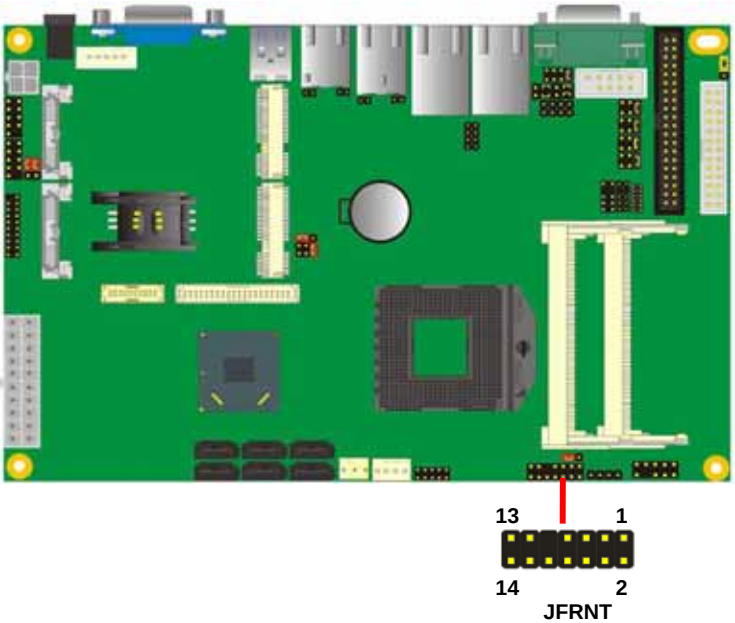
| Pin | Description | Pin | Description | Pin | Description |
|---|---|---|---|---|---|
| 1 | Ground | 2 | +12V | 3 | Sense |

## 2.15 <Switch and Indicator>

The **JFRNT** provides front control panel of the board, such as power button, reset and beeper, etc. Please check well before you connecting the cables on the chassis.

Connector: **JFRNT**
Type: onboard 14-pin (2 x 7) 2.54-pitch header

| Function | Signal | PIN | | Signal | Function |
|---|---|---|---|---|---|
| **IDE LED** | HDLED+ | 1 | 2 | PWRLED+ | **Power LED** |
| | HDLED- | 3 | 4 | N/C | |
| **Reset** | Reset+ | 5 | 6 | PWRLED- | |
| | Reset- | 7 | 8 | SPK+ | **Speaker** |
| | N/C | 9 | 10 | N/C | |
| **Power Button** | PWRBT+ | 11 | 12 | N/C | |
| | PWRBT- | 13 | 14 | SPK- | |



# Chapter 3 <System Setup>

## 3.1 <Audio Configuration>

The board integrates Intel® QM77 with REALTEK® ALC888 code. It can support 2-channel sound under system configuration. Please follow the steps below to setup your sound system.

1. Install REALTEK HD Audio driver.
2. Lunch the control panel and Sound Effect Manager.

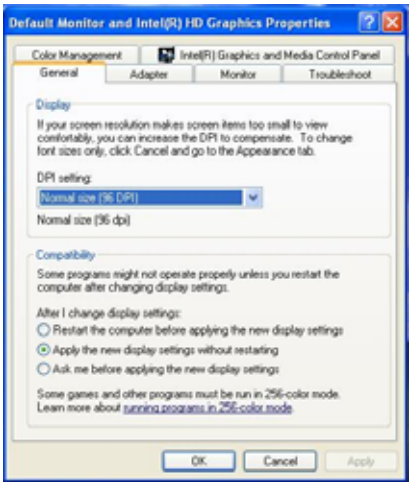
3. Select Speaker Configuration

## 3.2 <Display Properties Setting>

Based on Intel QM77 with HD Graphic, the board supports two DACs for display device as different resolution and color bit.

Please install the Intel Graphic Driver before you starting setup display devices.

1. Click right button on the desktop to lunch **display properties**


Default Monitor and Intel(R) HD Graphics Properties
Color Management
Intel(R) Graphics and Media Control Panel
General
Adapter
Monitor
Troubleshoot
Display
If your screen resolution makes screen items too small to view comfortably, you can increase the DPI to compensate. To change font sizes only, click Cancel and go to the Appearance tab.
DPI setting:
Normal size (96 DPI)
Normal size (96 dpi)
Compatibility
Some programs might not operate properly unless you restart the computer after changing display settings.
After I change display settings:
Restart the computer before applying the new display settings
Apply the new display settings without restarting
Ask me before applying the new display settings
Some games and other programs must be run in 256-color mode. Learn more about running programs in 256-color mode.
OK
Cancel
Apply

2. Click **Advanced** button for more specificity setup.

**Click Graphics Properties... for advanced setup**

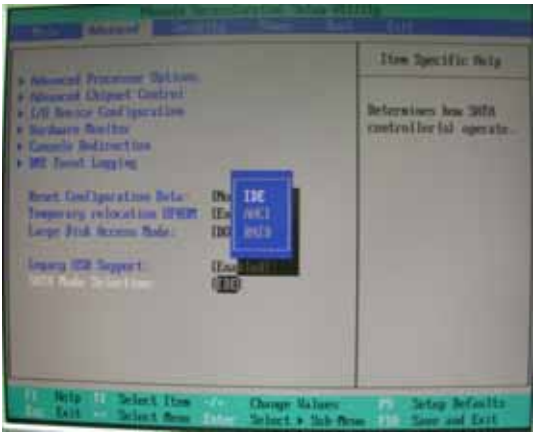
3. This setup options can let you define each device settings.

**Click Monitor to setup the CRT monitor for Resolution and Refresh Rate**

**Click Intel® Dual Display Clone to setup the dual display mode as same screen**

## 3.3 <SATA configuration>

### SATA Mode:




This option can let you select whether the Serial ATA hard drives would work under normal IDE mode or RAID mode. The RAID mode need more than one HDD is applied.

## 3.4 <SATA RAID Configuration>

The board integrates Intel® QM77 PCH with RAID function for Serial ATA drives, and supports the configurations below:

**RAID 0 (Stripping)**: Two hard drives operating as one drive for optimized data R/W performance. It needs two unused drives to build this operation.

**RAID 1 (Mirroring)**: Copies the data from first drive to second drive for data security, and if one drive fails, the system would access the applications to the workable drive. It needs two unused drives or one used and one unused drive to build this operation. The second drive must be the same or lager size than first one.

**RAID 5 (striping with parity)**

A RAID 5 array contains three or more hard drives where the data is divided into manageable blocks called strips. Parity is a mathematical method for recreating data that was lost from a single drive, which increases fault-tolerance. The data and parity are striped across all the hard drives in the array. The parity is striped in a rotating sequence to reduce bottlenecks associated with the parity calculations.

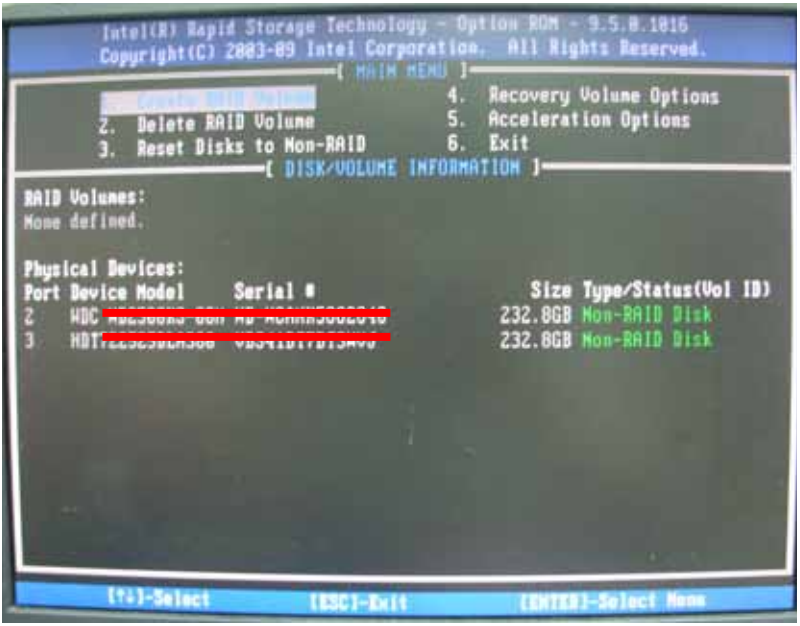
**RAID 10 (RAID 0+1)**

A RAID 10 array uses four hard drives to create a combination of RAID levels 0 and 1. The data is striped across a two-drive array forming the RAID 0 component. Each of the drives in the RAID 0 array is then mirrored by a RAID 1 component.

**Intel Matrix Storage Technology**: This technology would allow you to use **RAID 0+1** mode on only two drives (4 drives needed on traditional RAID 0+1). It will create two partitions on each hard drive to simulate **RAID 0** and **RAID 1**. It also can let you modify the partition size without re-formatted.

*For more information of Intel Matrix Storage Technology, please visit Intel's website.*

If you need to install an operation system on the RAID set, please use the driver disk attached in the package when it informs you to obtain the RAID drivers.


Intel(R) Rapid Storage Technology - Option ROM - 9.5.0.1016
Copyright(C) 2003-09 Intel Corporation. All Rights Reserved.
[ MAIN MENU ]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Recovery Volume Options
5. Acceleration Options
6. Exit
[ DISK/VOLUME INFORMATION ]
RAID Volumes:
None defined.
Physical Devices:
Port Device Model Serial # Size Type/Status(Vol ID)
2 WDC 232.8GB Non-RAID Disk
3 232.8GB Non-RAID Disk
[↑↓]-Select [ESC]-Exit [ENTER]-Select Menu

Please press **<CTRL+I>** to enter the RAID configuration menu.

You can setup the RAID under operation system for Microsoft® Windows XP SP1 , please install the Intel® Application Accelerator Ver.4.5 later to support RAID configuration with Intel® Matrix Storage Technology.

# Chapter 4 <BIOS Setup>

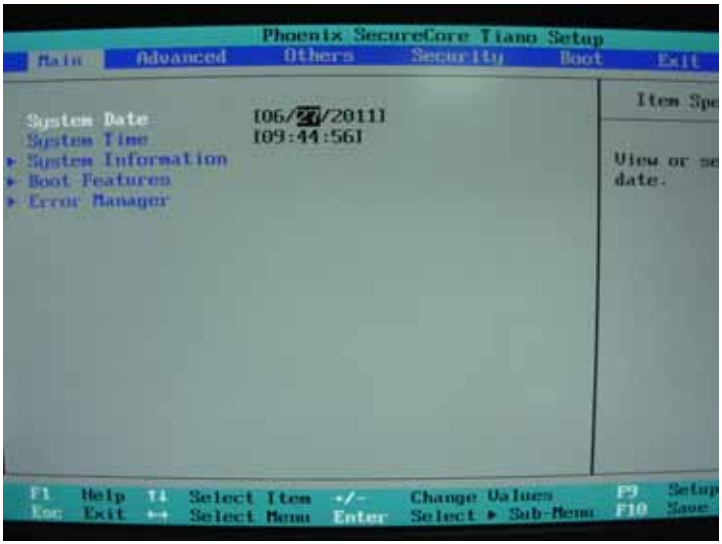
The motherboard uses the Phoenix BIOS for the system configuration. The Phoenix BIOS in the single board computer is a customized version of the industrial standard BIOS for IBM PC AT-compatible computers. It supports Intel x86 and compatible CPU architecture based processors and computers. The BIOS provides critical low-level support for the system central processing, memory and I/O sub-systems.

The BIOS setup program of the single board computer let the customers modify the basic configuration setting. The settings are stored in a dedicated battery-backed memory, NVRAM, retains the information when the power is turned off. If the battery runs out of the power, then the settings of BIOS will come back to the default setting.

The BIOS section of the manual is subject to change without notice and is provided here for reference purpose only. The settings and configurations of the BIOS are current at the time of print, and therefore they may not be exactly the same as that displayed on your screen.

To activate CMOS Setup program, press ＜DEL＞ key immediately after you turn on the system. The following message "Press DEL to enter SETUP" should appear in the lower left hand corner of your screen. When you enter the CMOS Setup Utility, the Main Menu will be displayed as **Figure 4-1**. You can use arrow keys to select your function, press ＜Enter＞ key to accept the selection and enter the sub-menu.

**Figure 4-1** CMOS Setup Utility Main Screen



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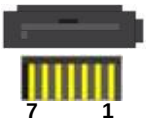
# Appendix A <I/O Port Pin Assignment>

## A.1 <Serial ATA Port>

Connector: **SATA1/2/3/4/5/6**

Type: 7-pin wafer connector




| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| GND | RSATA_TXP1 | RSATA_TXN1 | GND | RSATA_RXN1 | RSATA_RXP1 | GND |

## A.2 <IrDA Port>

Connector: **CN_IR**

Type: 5-pin header for SIR Ports

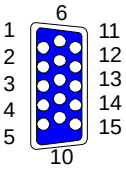
***JCSEL1 must jump to "SIR"***

| Pin | Description |
|---|---|
| 1 | VCC |
| 2 | N/C |
| 3 | IRRX |
| 4 | Ground |
| 5 | IRTX |

## A.3 <VGA Port>

Connector: **CRT**

Type: 15-pin D-sub female connector on bracket

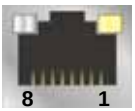



| Pin | Description | Pin | Description | Pin | Description |
|---|---|---|---|---|---|
| 1 | RED | 6 | Ground | 11 | N/C |
| 2 | GREEN | 7 | Ground | 12 | DDCDA |
| 3 | BLUE | 8 | Ground | 13 | HSYNC |
| 4 | N/C | 9 | N/C | 14 | VSYNC |
| 5 | Ground | 10 | Ground | 15 | DDCCLK |

## A.4 <LAN Port>

Connector: **RJ45**

Type: RJ45 connector with LED on bracket




| Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | MI0+ | MI0- | MI1+ | MI2+ | MI2- | MI1- | MI3+ | MI3- |

## A.5 <LAN LED Port>

Connector: **JSPD1/2**
Type: 5-pin header for LAN Speed LED connector

When Lan speed 10/100Mbps

| Pin | Description |
|---|---|
| 1 | LED- |
| 2 | LED+ |

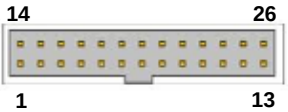
When Lan speed 1Gbps

| Pin | Description |
|---|---|
| 1 | LED+ |
| 2 | LED- |

Connector: **JATC1/2**
Type: 5-pin header for LAN Activity LED connector

| Pin | Description |
|---|---|
| 1 | LED- |
| 2 | LED+ |

## A.6 <Parallel Port>




Connector: **LPT**

Type: 26-Pin box header

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | -PSTB | 14 | AFD- |
| 2 | PRO0 | 15 | ERR- |
| 3 | PRO1 | 16 | INT- |
| 4 | PRO2 | 17 | SLIN- |
| 5 | PRO3 | 18 | Ground |
| 6 | PRO4 | 19 | Ground |
| 7 | PRO5 | 20 | Ground |
| 8 | PRO6 | 21 | Ground |
| 9 | PRO7 | 22 | Ground |
| 10 | ACK- | 23 | Ground |
| 11 | BUSY | 24 | Ground |
| 12 | PE | 25 | Ground |
| 13 | SLCT | 26 | N/C |

# Appendix B <Flash BIOS>

## B.1 <Flash Tool>

The board is based on Phoenix BIOS and can be updated easily by the BIOS auto flash tool. You can download the tool online at the address below:

**http://www.phoenix.com/en/home/**
**http://www.commell.com.tw/Support/Support_SBC.htm**

File name of the tool is "Phlash.exe", it's the utility that can write the data into the BIOS flash ship and update the BIOS.

## B.2 <Flash BIOS Procedure>

1. Please make a bootable floppy disk.
2. Get the last .bin files you want to update and copy it into the disk.
3. Copy Phlash.exe to the disk.
4. Power on the system and flash the BIOS.
(Example: C:/Pflash XXX.bin /bbl /cvar /sa)
5. Restart the system.

Any question about the BIOS re-flash please contact your distributors or visit the web-site at below:

**http://www.commell.com.tw/support/support.htm**

# Appendix C <Programming GPIO's>

The GPIO can be programmed with the MSDOS debug program using simple IN/OUT commands. The following lines show an example how to do this.

GPIO0…..GPIO7 bit0……bit7

-o 2 E 87 ;enter configuration

-o 2E 87

-o 2E 07

-o 2F 09 ;enale GPIO function

-o 2E 30

-o 2F 02 ;enable GPIO configuration

-o 2E F0

-o 2F xx ;set GPIO as input/output; set '1' for input,'0'for output

-o 2E F1

-o 2F xx ;if set GPIO's as output, in this register its value can be set

Optional :

-o 2E F2

-o 2F xx ; Data inversion register ; '1' inverts the current valus of the bits ,'0' leaves them as they are

-o 2E 30

-o 2F 01 ; active GPIO's

For further information, please refer to Winbrond W83627DHG-P datasheet.

# Appendix D <Programming Watchdog Timer >

The watchdog timer makes the system auto-reset while it stops to work for a period.

The integrated watchdog timer can be setup as system reset mode by program.

**Timeout Value Range**

- 1 to 255
- Second or Minute

**Program Sample**

Watchdog timer setup as system reset with 5 second of timeout

| | |
|---|---|
| 2E, 87 | |
| 2E, 87 | |
| 2E, 07 | |
| 2F, 08 | Logical Device 8 |
| 2E, 30 | Activate |
| 2F, 01 | |
| 2E, F5 | Set as Second* |
| 2F, 00 | |
| 2E, F6 | Set as 5 |
| 2F, 05 | |

* Minute: bit 3 = 1; Second: bit 3 = 0

You can select Timer setting in the BIOS, after setting the time options, the system will reset according to the period of your selection.

# Contact Information

Any advice or comment about our products and service, or anything we can help you please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.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